

What is Generation IV?

At the end of 2000, 438 nuclear power reactors were in operation in 31 countries around the world, generating electricity for nearly 1 billion people. They account for approximately 17 percent of worldwide installed base capacity for electricity generation and provide half or more of the electricity in a number of countries. As a whole, these reactors have an excellent operating record and are generating electricity in a reliable, environmentally safe, and affordable manner without emitting noxious gases into the atmosphere.

Concerns over energy resource availability, climate change, air quality, and energy security suggest an important role for nuclear power in future energy supplies. While the current Generation II and III nuclear power plant designs provide an economically, technically, and publicly acceptable electricity supply in many markets, further advances in nuclear energy system design can broaden the opportunities for the use of nuclear energy. To explore these opportunities, the U.S. Department of Energy's Office of Nuclear Energy, Science and Technology has engaged governments, industry, and the research community worldwide in a wide-ranging discussion on the development of next-generation nuclear energy systems known as "Generation IV".

Generation IV Technology Roadmap

The Generation IV Technology Roadmap will evaluate nuclear energy concepts, select the most promising concepts for further development, and define the research and development (R&D) needed to bring these concepts to maturity for potential commercialization. The Roadmap is being developed over a period of two years by U.S. and international experts.

The first step in the Roadmap is defining technology goals that capture sustainability, safety and reliability, and economic goals for energy production.

The technology goals for Generation IV nuclear energy systems were developed by a subcommittee of the Department's independent Nuclear Energy Research Advisory Committee (NERAC) in cooperation with the international research community. After multiple reviews by U.S. and international experts, the goals are now widely endorsed as an appropriate basis for deciding on a future, multinational R&D plan for developing advanced nuclear energy technologies.

Technical Working Groups will collect information on and evaluate four broad classes of nuclear energy system concepts by reactor coolant type: water, gas, liquid metal, and nonclassical. The Technical Working Groups will be assisted by our Evaluation Methods Group and other crosscutting groups that will conduct comparative assessments of alternative fuel cycles and specific technology areas.

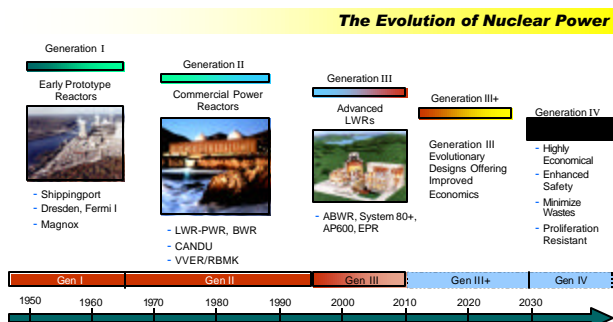
Concurrent with the long-term-focused Roadmap effort, a near-term review of the regulatory, technical, and institutional issues that need to be addressed to support the deployment of new reactors in the U.S. within the next ten years will also be conducted. This review will be incorporated into the Roadmap to give it both near- and long-term vision.

Generation IV International Forum (GIF)

GIF is a group of nine countries (Argentina, Brazil, Canada, France, Japan, Republic of Korea, Republic of South Africa, United Kingdom, United States) that are interested in jointly planning the future of nuclear energy. GIF started in January 2000 when these countries responded to a DOE invitation and has become the main source for international endorsement of and participation in the Roadmap.

The most recent GIF meeting in Paris in March 2001 produced the following results:

- A charter was finalized that formalizes GIF and provides a structure for R&D collaboration. The GIF charter is expected to be signed by at least five countries by July 16, 2001. Other countries are expected to follow.



DRAFT GEN IV TECHNOLOGY GOALS

Generation IV nuclear energy systems will:

- Provide sustainable energy generation that meets clean air objectives and promotes long-term availability of systems and effective fuel utilization for worldwide energy production.
- Minimize and manage their nuclear waste and notably reduce the long term stewardship burden in the future, thereby improving protection for the public health and the environment.
- Increase the assurance that they are a very unattractive and least desirable route for diversion or theft of weapons-usable materials.
- Excel in safety and reliability.
- Have a very low likelihood and degree of reactor core damage.
- Eliminate the need for offsite emergency response.
- Have a clear life-cycle cost advantage over other energy sources.
- Have a level of financial risk comparable to other energy projects.

- GIF endorsed the Generation IV technology goals with minor comments.
- Each country nominated members to participate in the Roadmap technical working group activities. Some will provide working group co-chairs.

- The next GIF Policy Group meeting is scheduled for October 10-11, 2001 in Miami, Florida.

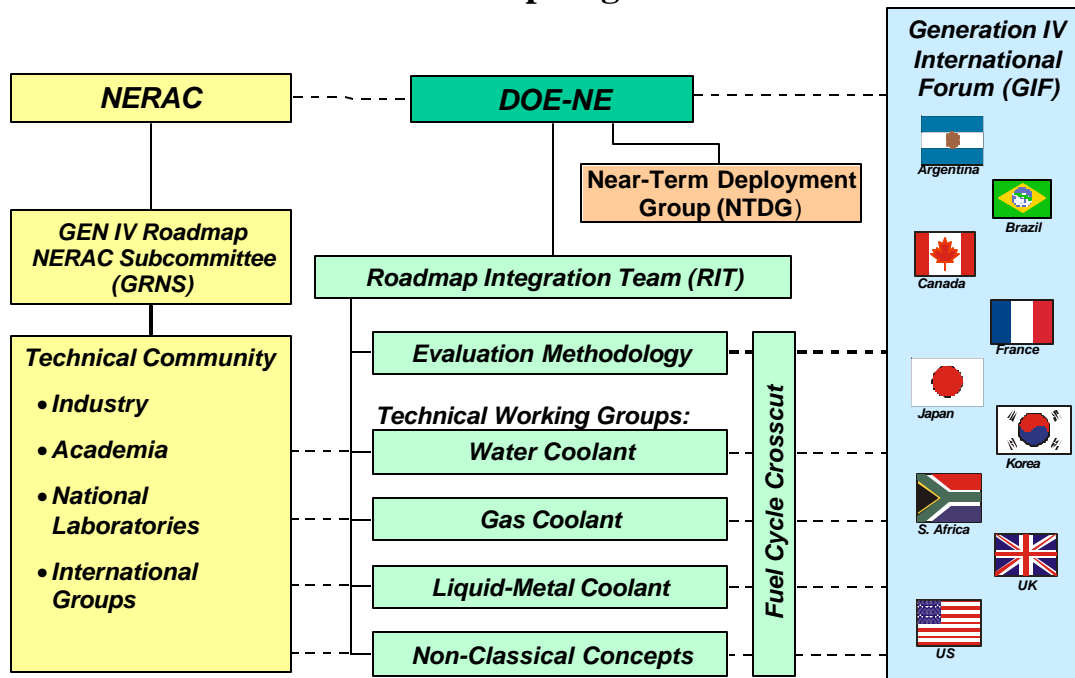
FY 2001 Program Accomplishments:

- Established the Generation IV Roadmap NERAC Subcommittee to provide advice and develop technology goals for Generation IV technologies.
- Established the Generation IV approach, management, staffing, and schedule for completion of the Roadmap.
- Complete the near-term deployment section of the Roadmap identifying the technical and institutional gaps that must be closed to enable one or more orders for commercial nuclear power plants in the U.S. by 2005 for deployment by 2010.

FY 2002 Planned Accomplishments:

- Hold two GIF meetings and begin identification of international collaborative projects.
- Identify and evaluate most promising Generation IV nuclear energy system concepts for further development.
- Complete draft of Roadmap to be submitted to Congress by March 2003.

Overall Roadmap Organization



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